

AMENDMENTS TO THE CLAIMS

1. (currently amended) An exhaust gas purifying apparatus of an internal combustion engine, comprising:

a light-off catalyst provided in an exhaust passage and having an O₂ storage capability such that said light-off catalyst passes, there through, at least CO in an exhaust gas to a downstream side of said light-off catalyst when the internal combustion engine is operating under a condition where the oxygen concentration of the exhaust gas is reduced;

exhaust gas purifying means provided in the exhaust passage at a downstream position ~~down stream~~ of and in series with said light-off catalyst, said exhaust gas purifying means ~~means~~ having a NOx catalyst for adsorbing NOx in the exhaust gas when an air-fuel ratio of the exhaust gas is lean and releasing the adsorbed NOx when the oxygen concentration of the exhaust gas is reduced, said exhaust gas purifying means further having a three-way catalyst that reacts with the released NOx; and

control means for recovering the NOx catalyst by reducing the oxygen concentration in the exhaust gas such that said CO that has passed through said light-off catalyst is introduced to said NOx catalyst when a NOx conversion efficiency of the NOx catalyst is decreased and maintaining the reduced oxygen concentration until

the adsorbed NOx in said NOx catalyst is released, calculating the NOx conversion efficiency after the recovery, and regenerating the NOx catalyst to release SOx only when the NOx conversion efficiency, calculated after the recovery, is less than a threshold value.

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2. (cancelled).

3. (original) The exhaust gas purifying apparatus as defined in claim 1, wherein an amount of oxygen adsorbed on said light-off catalyst is not greater than about 150 cc per one-liter volume of the catalyst when measured by an oxygen pulse method.

I 4. (previously presented) The exhaust gas purifying apparatus as defined in claim 3, wherein an oxygen component stored in said light-off catalyst is not greater than about 25g per one-liter volume of the catalyst.

5. (previously presented) The exhaust gas purifying apparatus as defined in claim 1, wherein the light-off catalyst has the oxygen storage capability of a first value and the three-way catalyst of the exhaust gas purifying means has a an oxygen storage capability of a second value greater than said first value.

6. (previously presented) The exhaust gas purifying apparatus as defined in claim 5, wherein an amount of oxygen

adsorbed on the three-way catalyst of said exhaust gas purifying means is not greater than about 150 cc per one-liter volume of the catalyst when measured by an oxygen pulse method.

7. (previously presented) The exhaust gas purifying apparatus as defined in claim 6, wherein an oxygen component stored in the three-way catalyst of said exhaust gas purifying means is not greater than about 25g per one-liter volume of the catalyst.

8. (previously presented) The exhaust gas purifying apparatus as defined in claim 1, wherein the internal combustion engine is a spark ignition type four-cycle engine that operates on the four-stroke cycle consisting of a suction stroke, compression stroke, combustion/expansion stroke, and exhaust stroke.

9. (original) The exhaust gas purifying apparatus as defined in claim 8, wherein the internal combustion engine is an in-cylinder injection type engine in which fuel is directly injected into a combustion chamber.

10. (previously presented) The exhaust gas purifying apparatus as defined in claim 1, wherein the exhaust gas purifying means is a single catalyst.

11. (previously presented) The exhaust gas purifying apparatus as defined in claim 10, wherein the single catalyst of

the exhaust gas purifying means includes a function of the three-way catalyst.

12. (previously presented) The exhaust gas purifying apparatus as defined in claim 10, wherein the light-off catalyst includes a single catalyst that functions as the three-way catalyst.

13. (previously presented) The exhaust gas purifying apparatus as defined in claim 12, wherein the exhaust gas purifying means further functions also as the NOx catalyst.

I 14. (previously presented) The exhaust gas purifying apparatus as defined in claim 13, wherein the light off catalyst functions also as an SOx catalyst.

15. (previously presented) The exhaust gas purifying apparatus as defined in claim 1, wherein said condition where the oxygen concentration of the exhaust gas is reduced includes at least one of a stoichiometric operating condition and a fuel rich operating condition.

16. (previously presented) An exhaust gas purifying apparatus as defined in claim 1, wherein said light-off catalyst mainly purifies HC in an exhaust gas emitted from the engine in a cold state.

17. (previously presented) An exhaust gas purifying apparatus as defined in claim 1, wherein said light-off catalyst is provided in the exhaust passage immediately downstream of the internal combustion engine.

18. (previously presented) An exhaust gas purifying apparatus as defined in claim 1, wherein said light-off catalyst has a reduced O₂ capability.

19. (previously presented) An exhaust gas purifying apparatus as defined in claim 18, wherein said light-off catalyst includes a three-way catalyst.

20. (previously presented) An exhaust gas purifying apparatus as defined in claim 18, wherein said light-off catalyst includes an oxidizing catalyst.

21. (currently amended) An exhaust gas purifying apparatus as defined in claim 18, wherein said control means sets the air-fuel ratio leaner as compared to an air-fuel ratio required to release the adsorbed NOx from the NOx catalyst when the NOx catalyst is used in conjunction with a three-way ~~another light-off~~ catalyst in which the O₂ storage capability is not reduced.

22. (currently amended) An exhaust gas purifying apparatus of an internal combustion engine, comprising:

a light-off catalyst provided in an exhaust passage and having an O₂ storage capability such that said light-off catalyst passes, there through, at least CO in an exhaust gas to a downstream side of said light-off catalyst when the internal combustion engine is operating under a condition where the oxygen concentration of the exhaust gas is reduced;

exhaust gas purifying means provided in the exhaust passage at a downstream position ~~down stream~~ of and in series with said light-off catalyst, said exhaust gas purifying means ~~means~~ having a NOx catalyst for adsorbing NOx in the exhaust gas when an air-fuel ratio of the exhaust gas is lean and releasing the adsorbed NOx when the oxygen concentration of the exhaust gas is reduced, said exhaust gas purifying means further having a three-way catalyst that reacts with the released NOx; and

control means for switching an air-fuel ratio of the exhaust gas from a an ~~an~~ lean air-fuel ratio to a stoichiometric air-fuel ratio or a rich air-fuel ratio while maintaining temperature of said NOx catalyst below ~~under~~ a temperature in which SOx is released.

23. (currently amended) An exhaust gas purifying apparatus of an internal combustion engine, comprising:

a light-off catalyst provided in an exhaust passage and having an O₂ storage capability such that said light-off catalyst passes, there through, at least CO in an exhaust gas to a downstream side of said light-off catalyst when the internal combustion engine is operating under a condition where the oxygen concentration of the exhaust gas is reduced;

I exhaust gas purifying means provided in the exhaust passage at a downstream position ~~down stream~~ of and in series with said light-off catalyst, said exhaust gas purifying means ~~means~~ having a NOx catalyst for adsorbing NOx in the exhaust gas when an air-fuel ratio of the exhaust gas is lean and releasing the adsorbed NOx when the oxygen concentration of the exhaust gas is reduced, said exhaust gas purifying means further having a three-way catalyst that reacts with the released NOx; and

control means for repeatedly releasing NOx adsorbed by the NOx catalyst every first interval and repeatedly releasing SOx adsorbed by the NOx catalyst every second interval longer than the first interval.
